IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:	PATENT APPLICATION
PAUL A. MEDWICK, et al.	
	Confirmation No.: 4576
Serial No.: 09/714,166	
	Group Art Unit: 1771
Filed: October 17, 2000	
	Examiner: Andrew Piziali
For: LOW SHADING COEFFICIENT AND LOW EMISSIVITY COATINGS AND COATED ARTICLES	Case No. 1559A1/RC

BRIEF ON APPEAL

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Sir:

In response to the Office Action mailed on December 1, 2004, this Appeal Brief is filed in compliance with 37 CFR 41.37(c). Appellants file this Appeal Brief, in triplicate, with the Board of Appeals and Interferences based on the rejections made in the Office Action mailed on December 1, 2004, in which the Examiner rejected claims 1, 3-18, 20-28 and 32-48 in the captioned application. A Notice of Appeal was mailed on February 24, 2005 and received by the United States Patent Office on February 28, 2005. Please charge the cost of filing the Appeal Brief plus any additional fees to Deposit Account No.16-2025.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, Washington, D.C. 20231

on May 18, 2005 (Date)  (Signature)

Joan A. Brown
Typed or Printed Name of Person Signing Certificate

REAL PARTY IN INTEREST

The application has been assigned to PPG Industries Ohio, Inc., Cleveland, Ohio; the assignment was recorded at Reel 011573/Frame 0611 on February 26, 2001.

RELATED APPEALS AND INTERFERENCES

A Notice of Appeal was filed for pending Application No. 09/945892, which is a Continuation-in-Part of the present application.

STATUS OF CLAIMS

Claims 1, 3-18, 20-28 and 32-48 are pending. Claims 1, 3-18, 20-28 and 32-48 are rejected and appealed.

STATUS OF AMENDMENTS

An amendment was mailed on October 29, 2004. The amendment was entered.

SUMMARY OF CLAIMED SUBJECT MATTER

The present invention is directed to an article coated with a low emissivity, low shading coefficient, low reflectance multi-layer coating and related methods. In one embodiment, the present invention is a solar control article comprising a substrate having a surface; a coating over the surface to provide a coated article having a visible light transmittance in the range of about 50 to about 70%, a shading coefficient less than about 0.33 and a reflectance less than about 30%, the coating comprising: a first antireflective layer over at least a portion of a substrate surface; a first infrared reflective layer over at least a portion of the first antireflective layer; a second antireflective layer over at least a portion of the first infrared reflective layer; a second infrared reflective layer having a thickness ranging

from 159 to 257 angstroms over the second antireflective layer; and a third antireflective layer having a thickness ranging from 60 to 273 angstroms over the second infrared reflective layer.

The various elements of the present invention as recited in claim 1 are described in the specification at the following locations. The substrate is described at page 10, lines 3-10. The first antireflective layer is described at page 10, line 26 to page 11, line 14. The first infrared reflective film is described at page 11, lines 29-35. The second antireflective layer is described at page 12, lines 17-31. The second infrared reflective layer is described at page 12, line 32 to page 13, line 2. The third antireflective layer is described at page 13, lines 6-17. The properties of the coated article are described at page 22, lines 4-7.

The present invention is also directed to a solar control coated article, comprising: a transparent substrate having a surface; a coating over the surface to provide a coated article having a visible light transmittance in the range of about 50 to about 70%, a shading coefficient less than about 0.33 and a reflectance less than about 30%, the coating comprising: a first antireflective layer over a substrate surface, wherein the first antireflective layer has a thickness of about 272 to about 332 angstroms; a first infrared reflective layer over the first antireflective layer, wherein the first infrared reflective layer has a thickness of about 86 to about 269 angstroms; a first primer layer deposited over the first infrared reflective layer, wherein the primer layer has a thickness of about 15 to about 30 angstroms; a second antireflective layer deposited over the first primer layer, wherein the second antireflective layer has a thickness of about 198 to about 836 angstroms; a second

infrared reflective layer deposited over the second antireflective layer, wherein the second infrared reflective layer has a thickness of about 159 to about 257 angstroms; a second primer film deposited over the second infrared reflective layer, wherein the primer layer has a thickness of about 15 to about 30 angstroms; and a third antireflective layer deposited over the second primer layer, wherein the third antireflective layer has a thickness of about 60 to about 273 angstroms.

The first primer layer is described at page 12, lines 1-12. The second primer film is described at page 13, lines 3-5.

The present invention is further directed towards a method of making a solar control article, comprising the steps of: providing a substrate having a surface; depositing a coating over at least a portion of the surface of the substrate to provide a coated article having a visible light transmittance in the range of about 50 to about 70%, a shading coefficient less than about 0.33 and a reflectance less than about 30%, the depositing step comprising the steps of: depositing a first antireflective layer over at least a portion of a substrate surface; depositing a first infrared reflective layer over at least a portion of the first antireflective layer; depositing a second antireflective layer deposited over at least a portion of the first infrared reflective layer; depositing a second infrared reflective layer deposited over at least a portion of the second antireflective layer, wherein the second infrared reflective layer has a thickness of about 159 to about 257 angstroms; and depositing a third antireflective layer having a thickness ranging from 60 to 273 angstroms over the second infrared reflective layer.

The method of making the solar control article is described at page 10, lines 14-23.

The present invention is also directed towards a solar control article, comprising: a substrate having a surface; and a coating over the surface to provide a coated article having a LCS defined as the percent of visible light transmittance expressed as a decimal divided by the shading coefficient that is equal to or greater than 1.86, the coating comprising: a first antireflective layer over at least a portion of a substrate surface, a first infrared reflective layer over at least a portion of the first antireflective layer, a second antireflective layer deposited over at least a portion of the first infrared reflective layer, a second infrared reflective layer deposited over at least a portion of the second antireflective layer, wherein the second infrared reflective layer has a thickness of about 159 to about 257 angstroms, and a third antireflective layer having a thickness ranging from 60 to 273 angstroms over the second infrared reflective layer.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Claims 1, 3-18, 20-25, 27, 28 and 32-48 stand rejected under 35 U.S.C. 103(a) as being obvious over U.S. Patent No. 6,045,896 ("Boire").
2. Claims 26, 46 and 47 stand rejected under 35 U.S.C. 103(a) as being obvious over Boire and further in view of U.S. Patent No. 5,821,001 ("Arbab").
3. Claims 40 and 41 stand rejected under 35 U.S.C. 103(a) as being obvious over Boire and further in view of U.S. Patent No. 5,776,603 ("Zagdoun").

4. Claim 44 stands rejected under 35 U.S.C. 103(a) as being obvious over Boire and further in view of U.S. Patent No. 4,489,134 ("Yudenfriend").

5. Claims 1-18, 20-28, 32-39 and 43-48 stand rejected under 35 U.S.C. 103(a) as being obvious over Arbab.

6. Claims 40 and 41 stand rejected under 35 U.S.C. 103(a) as being obvious over Arbab as and further in view of Zagdoun.

7. Claim 44 stands rejected under 35 U.S.C. 103(a) as being obvious over Arbab and further in view of Yudenfriend.

ARGUMENT

Rejection of Claims 1, 3-18, 20-25, 27, 28 and 32-48 under 35 U.S.C. 103(a) over Boire.

Claims 1-18, 20-25, 27, 28 and 32-48 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Boire. The Examiner took Official Notice that it is known in the art that increasing the thickness of an infrared reflective layer (s) will increase the reflectance while decreasing the transmittance of a coating. The Examiner also stated that it would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the thickness of the second infrared layer of Boire, such as to between 159 and 257 angstroms, because some applications desire high reflectance/low transmittance coatings, as taught by Boire in column 9, lines 15-23, and because it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. The Examiner further stated that Boire fails to specifically mention a shading coefficient, U value or LCS, but considering the substantially identical coated article disclosed by Boire,

after adjustment of the second infrared reflective layer thickness, compared to the claimed coated article, the coated article of Boire would inherently possess the claimed properties.

The rule of law can be stated as follows: That which may be inherent is not necessarily known, and obviousness cannot be predicated on what is unknown. In re Sporman, 363 F.2d 444, 448, 150 U.S.P.Q. 449, 452 (C.C.P.A. 1966). Further, where the prior art has not recognized the "result-effective" capability of a particular invention parameter, no expectation would exist that optimizing the parameter would successfully yield the desired improvement. In re Antoine, 559 F.2d 618, 1977 CCPA LEXIS 118, 195 U.S.P.Q (BNA) 6 (C.C.P.A. 1977).

In this case, the present invention recognizes the "result-effective" capability of several parameters in combination, namely, a second infrared reflective layer having a certain thickness range and a third antireflective layer having a certain thickness range, to provide a solar control article having specific properties. As recited in claim 1, a solar control article, comprising: a second infrared reflective layer having a thickness ranging from 159 to 257 angstroms over a second antireflective layer and a third antireflective layer having a thickness ranging from 60 to 273 angstroms over the second infrared reflective layer is able to exhibit a visible light transmittance in the range of 50 to 70%, a shading coefficient less than 0.33 and a reflectance less than 30%.

In contrast to the present invention as recited in claim 1, Boire does not disclose or teach the result-effective capability of a combination of a second infrared reflective layer having a certain thickness and a third antireflective layer having a

certain thickness. Rather, Boire discloses and teaches a generic glazing assembling having various functional layers having reflection properties in the infrared radiation, in the solar radiation or in both ranges and at least one coating layer comprised of a dielectric material. Furthermore, Boire doesn't even explicitly disclose the thicknesses of any of the functional layers or coatings.

For guidance on the layer thicknesses encompassed by Boire, it is necessary to look at the examples. The examples of Boire contain a second functional layer (the second infrared reflective layer of the invention) having a thickness ranging from 80 to 120 angstroms and a third coating layer (the third antireflective layer of the invention) having a thickness of approximately 350 angstroms. See Tables 1 and 3 in Boire (the third antireflective layer is made up of (8a) and (8b)).

A comparison of the layers in the present invention with the corresponding layers in Boire reveals the present invention has a thicker second infrared reflective layer (159 to 157 angstroms versus 80 to 120 angstroms) and a thinner third antireflective layer (60 to 273 angstroms versus approximately 350 angstroms). Given the different thickness ranges of the second infrared reflective layer and the third antireflective layer of the present invention and Boire as well as the magnitude of the difference, it seems implausible to conclude that Boire discloses or teaches the result effective capability of a combination of a second infrared reflective layer having a specified thickness and a third antireflective layer having a specified thickness like the present invention when Boire does not disclose the interrelation between the ranges of the infrared reflective layer and the resulting

properties of the coating. Because Boire does not disclose or teach the result effective capability of the combination of the second infrared reflective layer and the third antireflective layer of the present invention, claim 1 is patentably distinguishable over Boire.

Claims 3-15 and 39-47 directly or indirectly depend on claim 1 and recite the present invention in varying scope. Applicants have discussed above how claim 1 is patentably distinguishable over Boire. There is nothing in Boire that teaches or suggests the invention of claim 1 as further limited by claims 3-15 and 39-47. As a result, claims 3-15 and 39-47 are patentably distinguishable over Boire.

For the reasons discussed above in connection with claim 1, there is nothing in Boire that teaches or suggests the solar control coated article of claim 16. Specifically, there is no disclosure or teaching of the result effective capability of the combination of the second infrared reflective layer and the third antireflective layer of the present invention. Claim 16 even goes beyond claim 1 in that it claims the result effective capability of a combination of a first antireflective layer, a first infrared reflective layer, a first primer layer, a second antireflective layer, a second infrared reflective layer, a second primer layer, and a third antireflective layer. A thickness range is specified for each of the abovementioned coating layers. As a result, claim 16 is patentably distinguishable over Boire.

Claims 17, 18, 20-25, 27 and 28 directly or indirectly depend on claim 16 and recite the present invention in varying scope. Applicants have discussed above how claim 16 is patentably distinguishable over Boire. There is nothing in Boire that teaches or suggests the invention of claim 16 as further limited by claims

17, 18, 20-25, 27 and 28. As a result, claims 17, 18, 20-25, 27 and 28 are patentably distinguishable over Boire.

For the reasons discussed above in connection with claim 1, there is nothing in Boire that teaches or suggests the method of making a solar control coated article recited in claim 32. Specifically, there is no disclosure or teaching of a method involving the result effective capability of a combination of depositing a second infrared reflective layer having a specified thickness and depositing a third antireflective layer having a specified thickness.

Claims 33-38 directly or indirectly depend on claim 32 and recite the present invention in varying scope. Applicants have discussed above how claim 32 is patentably distinguishable over Boire. There is nothing in Boire that teaches or suggests the invention of claim 32 as further limited by claims 33-38. As a result, claims 33-38 are patentably distinguishable over Boire.

For the reasons discussed above in connection with claim 1, there is nothing in Boire that teaches or suggests the method of making a solar control coated article recited in claim 48. Specifically, there is no disclosure or teaching of the result effective capability of the combination of the second infrared reflective layer and the third antireflective layer of the present invention. In claim 48, the result effective capability is directed towards providing a solar control article having an LCS that is equal to or greater than 1.86. As a result, claim 48 is patentably distinguishable over Boire.

Rejection of claims 26, 46 and 47 under 35 U.S.C. 103(a) over Boire and further in view of Arbab

Claims 26, 46 and 47 were rejected under 35 U.S.C. 103(a) as being unpatentable over Boire as applied to claims 1-18, 20-25, 27, 28, and 32-48 above, and further in view of Arbab. The Examiner stated in the Office Action that Arbab discloses primer layers may include titanium, and it would have been obvious to one having ordinary skill in the art to use titanium for the primer layers of Boire.

Claim 26 directly depends on claim 16 and recites the present invention in varying scope. Applicants have discussed above how claim 16 is patentably distinguishable over Boire. There is nothing in Boire, considered alone and in view of Arbab, that teaches or suggests the invention of claim 16 as further limited by claim 26. As a result, claim 26 is patentably distinguishable over Boire in view of Arbab.

Claims 46 and 47 indirectly depend from claim 1 and recite the present invention in varying scope. Applicants have discussed above how claim 1 is patentably distinguishable of Boire. There is nothing in Boire, considered alone and in view of Arbab, that teaches or suggests the invention of claim 1 as further limited by claims 46 and 47. As a result, claims 46 and 47 are patentably distinguishable over Boire in view of Arbab

Rejection of claims 40 and 41 over Boire and further in view of Zagdoun

Claims 40 and 41 were rejected under 35 U.S.C. 103(a) as being unpatentable over Boire as applied to claims 1-18, 20-25, 27, 28 and 32-48 above,

and further in view of Zagdoun. The Examiner stated that it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the glass article of Boire in a dual glass plate arrangement with a gas-filled space, as disclosed by Zagdoun, because the article would possess reinforced thermal insulation suitable for many applications.

Claims 40 and 41 indirectly depend on claim 1 and recite the present invention in varying scope. Applicants have discussed above how claim 1 is patentably distinguishable over Boire. There is nothing in Boire, considered alone and in view of Zagdoun, that teaches or suggests the invention of claim 1 as further limited by claims 40 and 41. As a result, claims 40 and 41 are patentably distinguishable over Boire in view of Zagdoun.

Rejection of claim 44 as being unpatentable over Boire and further in view of Yudenfriend

Claim 44 was rejected under 35 U.S.C. 103(a) as being unpatentable over Boire as applied to claims 1-18, 20-25, 27, 28 and 32-48 above, and further in view of Yudenfriend. The Examiner stated that it would have been obvious to one having ordinary skill in the art at the time the invention was made to apply a removable protective film to the coated article of Boire, because the removable film would prevent the formation of blemishes and scratches during manufacturing or transportation of the article.

Claim 44 directly depends on claim 1 and recites the present invention in varying scope. Applicants have discussed above how claim 1 is patentably

distinguishable over Boire. There is nothing in Boire, considered alone and in view of Yudenfriend, that teaches or suggests the invention of claim 1 as further limited by claim 44. As a result, claim 44 is patentably distinguishable over Boire in view of Yudenfriend.

Rejection of claims 1-18, 20-28, 32-39 and 43-48 as being obvious over Arbab

Claims 1-18, 20-28, 32-39 and 43-48 were rejected under 35 U.S.C. 103(a) as being unpatentable over Arbab. The Examiner stated that Arbab does not mention a thickness range for the second infrared reflective layer. The Examiner further stated that it would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the thickness of the second infrared layer of Arbab, such as to between 159 and 257 angstroms, because some applications desire high reflectance/low transmittance coatings, and because it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

The rule of law is shown above. In this case, the present invention recognizes the "result-effective" capability of several parameters in combination, namely, a second infrared reflective layer having a certain thickness in combination with a third antireflective layer having a certain thickness to provide a solar control article having specific properties. As recited in claim 1, the solar control article comprises a second infrared reflective layer having a thickness ranging from 159 to 257 angstroms over a second antireflective layer and a third antireflective layer having a thickness ranging from 60 to 273 angstroms over the second infrared

reflective layer such that the article exhibits a visible light transmittance in the range of 50 to 70%, a shading coefficient less than 0.33 and a reflectance less than 30%.

In contrast to the present invention, Arbab does not disclose or teach the result-effective capability of a second infrared reflective layer and a third antireflective layer having certain thickness ranges. Rather, Arbab discloses and teaches a generic coated article having at least one dielectric, antireflective base film including (a) a support film-part and (b) a crystalline metal-contacting film-part overlying the support film-part and at least one metallic reflective film. Furthermore, Arbab doesn't even explicitly disclose the thickness of any of the coating layers.

For guidance on the layer thicknesses encompassed by Arbab, it is necessary to look at the examples. The example in Arbab with two reflective layers contains a second reflective film of silver (the second infrared reflective layer of the invention) having a thickness of approximately 130 angstroms and a third antireflective film (the third antireflective layer of the invention) having a thickness of approximately 270 angstroms. See Example 3 at col. 19, line 29, to column 20, line 16.

A comparison of the layers in the present invention with the corresponding layers in Arbab reveals the present invention has a thicker second infrared reflective layer (159 to 157 angstroms versus approximately 130 angstroms) and a generally thinner third antireflective layer (60 to 273 angstroms versus approximately 270 angstroms). Given the different thickness ranges of the second infrared reflective layer and the third antireflective layer of the present invention and Arbab and absence of any discussion relating to the properties resulting from the

interaction between the coating layers having specific thicknesses, it seems implausible to conclude that Arbab discloses or teaches the result effective capability of a combination of a second infrared reflective layer having a specified thickness and a third antireflective layer having a specified thickness like the present invention and more specifically, the combination of layer thicknesses that result in an article having the recited transmittance, reflectance and shading coefficient. Because Arbab does not disclose or teach the result effective capability of the combination of the second infrared reflective layer and the third antireflective layer of the present invention, claim 1 is patentably distinguishable over Arbab.

Claims 3-18, 39 and 43-47 directly or indirectly depend on claim 1 and recite the present invention in varying scope. Applicants have discussed above how claim 1 is patentably distinguishable over Arbab. There is nothing in Arbab that teaches or suggests the invention of claim 1 as further limited by claims 3-18, 39 and 43-47. As a result, claims 3-18, 39 and 43-47 are patentable distinguishable over Arbab.

For the reasons discussed above in connection with claim 1, there is nothing in Arbab that teaches or suggests the solar control coated article of claim 16. Specifically, there is no disclosure or teaching of the result effective capability of the combination of the second infrared reflective layer and the third antireflective layer of the present invention. Claim 16 even goes beyond claim 1 in that it claims the result effective capability of a combination of a first antireflective layer, a first infrared reflective layer, a first primer layer, a second antireflective layer, a second infrared reflective layer, a second primer layer, and a third antireflective layer. A thickness

range is specified for each of the abovementioned coating layers. As a result, claim 16 is patentably distinguishable over Arbab.

Claims 17, 18 and 20-28 directly or indirectly depend on claim 16 and recite the present invention in varying scope. Applicants have discussed above how claim 16 is patentably distinguishable over the references of record. There is nothing in Arbab that teaches or suggests the invention of claim 16 as further limited by claims 17, 18 and 20-28. As a result, claims 17, 18 and 20-28 are patentably distinguishable over Arbab.

For the reasons discussed above in connection with claim 1, there is nothing in Arbab that teaches or suggests the method of making a solar control coated article recited in claim 32. Specifically, there is no disclosure or teaching of a method involving the result effective capability of a combination of depositing a second infrared reflective layer having a specified thickness and depositing a third antireflective layer having a specified thickness.

Claims 33-38 directly or indirectly depend on claim 32 and recite the present invention in varying scope. Applicants have discussed above how claim 32 is patentably distinguishable. There is nothing in Arbab that teaches or suggests the invention of claim 32 as further limited by claims 33-38. As a result, claims 33-38 are patentably distinguishable over Arbab.

For the reasons discussed above in connection with claim 1, there is nothing in Arbab that teaches or suggests the method of making a solar control coated article recited in claim 48. Specifically, there is no disclosure or teaching of the result effective capability of the combination of the second infrared reflective

layer and the third antireflective layer of the present invention. In claim 48, the result effective capability is directed towards providing a solar control article having an LCS that is equal to or greater than 1.86. As a result, claim 48 is patentably distinguishable over Arbab.

Rejection of claims 40 and 41 as being obvious over Arbab as and further in view of Zagdoun

Claims 40 and 41 were rejected under 35 U.S.C. 103(a) as being unpatentable over Arbab as applied to claims 1-18, 20-28, 32-39 and 43-48 above, and further in view of Zagdoun. The Examiner stated in the Office Action that Zagdoun discloses the mounting of a coated glass article between two substrates with a gas-filled space defined there between for reinforced thermal insulation.

Claims 40 and 41 indirectly depend on claim 1 and recite the present invention in varying scope. Applicants have discussed above how claim 1 is patentably distinguishable over Arbab. There is nothing in Arbab, considered alone and in view of Zagdoun, that teaches or suggests the invention of claim 1 as further limited by claims 40 and 41. As a result, claims 40 and 41 are distinguishable over Arbab in view of Zagdoun.

Rejection of claim 44 as being obvious over Arbab and further in view of Yudenfriend

Claim 44 was rejected under 35 U.S.C. 103(a) as being unpatentable over Arbab as applied to claims 1-18, 20-28, 32-39 and 43-48 above, and further in view of Yudenfriend. The Examiner stated in the Office Action that Yudenfriend

discloses placing a removable protective layer on a window film to prevent the film from forming blemishes and scratches during manufacturing.

Claim 44 directly depends on claim 1 and recites the present invention in varying scope. Applicants have discussed above how claim 1 is patentably distinguishable over Arbab. There is nothing in Arbab, considered alone and in view of Yudenfriend, that teaches or suggests the invention of claim 1 as further limited by claim 44. As a result, claim 44 is distinguishable over Arbab in view of Yudenfriend.

Conclusion

It is respectfully requested that the present application be remanded to the Examiner for issuance of a Notice of Allowance. For the reasons stated above, the present invention as recited in the claims is patentably distinguishable over the cited references.

Respectfully submitted,

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CLAIMS APPENDIX

Claim 1 (currently amended) A solar control article, comprising:

a substrate having a surface;

a coating over the surface to provide a coated article having a visible light transmittance in the range of about 50 to about 70%, a shading coefficient less than about 0.33 and a reflectance less than about 30%, the coating comprising:

a first antireflective layer over at least a portion of a substrate surface;

a first infrared reflective layer over at least a portion of the first antireflective layer;

a second antireflective layer over at least a portion of the first infrared reflective layer;

a second infrared reflective layer having a thickness ranging from 159 to 257 angstroms over the second antireflective layer; and

a third antireflective layer having a thickness ranging from 60 to 273 angstroms over the second infrared reflective layer.

Claim 2 (canceled)

Claim 3 (currently amended) The article as claimed in claim 1, including a first primer layer deposited over the first infrared reflective layer and a second primer layer deposited over the second infrared reflective layer.

Claim 4 (currently amended) The article as claimed in claim 1, wherein the antireflective layers include metal-oxide films selected from one or more metal oxides, oxides of metal alloys, doped metal oxides and mixtures thereof.

Claim 5 (currently amended) The article as claimed in claim 1, wherein the one or more metal oxides are selected from zinc oxide, titanium oxide, hafnium oxide, zirconium oxide, niobium oxide, bismuth oxide, indium oxide, tin oxide and mixtures thereof.

Claim 6 (previously presented) The article as claimed in claim 4, wherein the metal alloys are selected from the group consisting of zinc stannate, tin alloys, fluorine doped tin, antimony doped tin, and indium-tin alloys.

Claim 7 (currently amended) The article as claimed in claim 1, wherein at least one of the antireflective layers comprises a plurality of antireflective films.

Claim 8 (currently amended) The articles as claimed in claim 1, wherein the infrared reflective films include at least one metal selected from the group consisting of gold, copper, platinum, and silver and mixtures thereof.

Claim 9 (currently amended) The article as claimed in claim 1, wherein the first antireflective layer has a thickness of about 272 to about 332 angstroms, the second antireflective layer has a thickness of about 198 to about 836 angstroms and the third antireflective layer has a thickness of about 60 to about 273 angstroms.

Claim 10 (currently amended) The article as claimed in claim 1, wherein the first infrared reflective layer has a thickness of about 86 to about 269 angstroms.

Claim 11 (original) The article as claimed in claim 3, wherein the first and second primer layers each have a thickness of about 15 to about 30 angstroms.

Claim 12 (currently amended) The article as claimed in claim 1, wherein the thickness of the second infrared reflective layer is about 50 to about 100% greater than the thickness of the first infrared reflective layer.

Claim 13 (currently amended) The article as claimed in claim 1, including a protective overcoat deposited over the third antireflective layer.

Claim 14 (original) The article as claimed in claim 1, wherein the substrate is selected from the group consisting of glass, plastic and ceramic.

Claim 15 (original) The article as claimed in claim 1, wherein the article is an insulated glass unit.

Claim 16 (previously presented) A solar control coated article, comprising:

a transparent substrate having a surface;

a coating over the surface to provide a coated article having a visible light transmittance in the range of about 50 to about 70%, a shading coefficient less than about 0.33 and a reflectance less than about 30%, the coating comprising:

a first antireflective layer over a substrate surface, wherein the first antireflective layer has a thickness of about 272 to about 332 angstroms;

a first infrared reflective layer over the first antireflective layer, wherein the first infrared reflective layer has a thickness of about 86 to about 269 angstroms;

a first primer layer deposited over the first infrared reflective layer, wherein the primer layer has a thickness of about 15 to about 30 angstroms;

a second antireflective layer deposited over the first primer layer, wherein the second antireflective layer has a thickness of about 198 to about 836 angstroms;

a second infrared reflective layer deposited over the second antireflective layer, wherein the second infrared reflective layer has a thickness of about 159 to about 257 angstroms;

a second primer film deposited over the second infrared reflective layer, wherein the primer layer has a thickness of about 15 to about 30 angstroms; and

a third antireflective layer deposited over the second primer layer, wherein the third antireflective layer has a thickness of about 60 to about 273 angstroms.

Claim 17 (original) The article as claimed in claim 16, wherein the article has a substantially neutral color.

Claim 18 (previously presented) The article as claimed in claim 16, wherein the article has a shading coefficient of less than about 0.32 and an external reflectance less than about 20%.

Claim 19 (canceled)

Claim 20 (original) The article as claimed in claim 16, wherein the antireflective films include a metal oxide film selected from the group consisting of metal oxides, metal alloys, doped metal oxides and mixtures thereof.

Claim 21 (original) The article as claimed in claim 20, wherein in the metal oxides are selected from the group consisting of zinc oxide, titanium oxide, hafnium oxide, zirconium oxide, niobium oxide, bismuth oxide, indium oxide, tin oxide and mixtures thereof.

Claim 22 (original) The article as claimed in claim 20, wherein the metal alloys are selected from the group consisting of zinc stannate, fluorine doped tin, antimony doped tin, and indium-tin alloys.

Claim 23 (original) The article as claimed in claim 20, wherein the doped metal oxides are selected from the group consisting of antimony doped tin oxide and indium doped tin oxide.

Claim 24 (original) The article as claimed in claim 16, wherein the first infrared reflective layer includes a metal from the group consisting of gold, copper, platinum, and silver and mixtures thereof.

Claim 25 (original) The article as claimed in claim 16, where at least one of the first, second, or third antireflective layers includes a plurality of antireflective films.

Claim 26 (original) The article as claimed in claim 16, wherein the primer layer includes titanium.

Claim 27 (original) The article as claimed in claim 16, including a protective, metal containing overcoat deposited over the third antireflective layer.

Claim 28 (original) The article as claimed in claim 16, wherein the article is an insulated glass unit.

Claims 29–31 (canceled)

Claim 32 (currently amended) A method of making a solar control article, comprising the steps of:

providing a substrate having a surface;

depositing a coating over at least a portion of the surface of the substrate to provide a coated article having a visible light transmittance in the range of about 50 to about 70%, a shading coefficient less than about 0.33 and a reflectance less than about 30%, the depositing step comprising the steps of:

depositing a first antireflective layer over at least a portion of a substrate surface;

depositing a first infrared reflective layer over at least a portion of the first antireflective layer;

depositing a second antireflective layer deposited over at least a portion of the first infrared reflective layer;

depositing a second infrared reflective layer deposited over at least a portion of the second antireflective layer, wherein the second infrared reflective layer has a thickness of about 159 to about 257 angstroms; and

depositing a third antireflective layer having a thickness ranging from 60 to 273 angstroms over the second infrared reflective layer.

Claim 33 (previously presented) The method as claimed in claim 32, further comprising depositing a third antireflective layer over the second infrared reflective layer.

Claim 34 (original) The method as claimed in claim 32, including depositing a first primer film over the first infrared reflective film and depositing a second primer film over the second infrared reflective film.

Claim 35 (original) The method as claimed in claim 32, wherein the article has a substantially neutral color.

Claim 36 (original) The article as claimed in claim 32, wherein the antireflective layer depositing step is practiced by depositing a plurality of antireflective films to form the at least one antireflective layer.

Claim 37 (previously presented) The method as claimed in claim 33, wherein the first infrared reflective film has a thickness of about 86 to about 269 angstroms.

Claim 38 (original) The method as claimed in claim 34, wherein the first and second primer films each have a thickness of about 15 to about 20 angstroms.

Claim 39 (previously presented) The article as claimed in claim 4, wherein the metal-oxide film is zinc stannate film.

Claim 40 (previously presented) The article as claimed in claim 15 wherein the insulated glass unit has a reflectance selected from luminous exterior or interior reflectance of less than about 30%.

Claim 41 (previously presented) The article as claimed in Claim 15, wherein the insulated glass unit has a pair of spaced-apart first and second at least

semitransparent substrates separated by one or more spacers wherein the substrates and spacers are sealed to form an interior gap which may be filled with a selected atmosphere, selected from argon or air and wherein at least one of the substrates has on the surface facing the gap at least one antireflective layer deposited over the substrate surface and at least one infrared reflective film deposited over the at least one antireflective layer.

Claim 42 (previously presented) The article as claimed in Claim 15, wherein the insulated glass unit has i) a pair of spaced-apart first and second at least semitransparent substrates separated by one or more spacers wherein the substrates and spacers are sealed to form an interior gap which may be filled with a selected atmosphere, selected from argon or air; and ii) one or more polymeric films placed in the gap wherein at least one of the polymeric films is the coated article.

Claim 43 (previously presented) The article as claimed in Claim 15 having a U value in the range of 0.24 to 0.30.

Claim 44 (previously presented) The article as claimed in claim 1 wherein the coated article has a temporary protective film.

Claim 45 (previously presented) The article as claimed in claim 7, wherein the plurality of antireflective films comprises a zinc stannate film and a zinc oxide film.

Claim 46 (previously presented) The article as claimed in claim 45, wherein the zinc oxide film is deposited over the zinc stannate film wherein the zinc stannate film is sputtered from a zinc-tin cathode and the zinc oxide film is deposited from a zinc cathode having 10 wt% or less of tin and the zinc oxide film has a thickness from 20 to 70 Angstroms.

Claim 47 (previously presented) The solar control article as claimed in claim 15 wherein (i) the solar control article is an insulated glass unit having a first pane and a second pane space from the first pane, (ii) the substrate of the coated article is a clear glass substrate, (iii) the coated article is the first pane, (iv) the second pane is a clear glass sheet and (v) the insulating unit has a blue or blue-gray color in transmission.

Claim 48 (currently amended) A solar control article, comprising:

a substrate having a surface; and

a coating over the surface to provide a coated article having a LCS defined as the percent of visible light transmittance expressed as a decimal divided by the shading coefficient that is equal to or greater than 1.86, the coating comprising:

a first antireflective layer over at least a portion of a substrate surface,

a first infrared reflective layer over at least a portion of the first antireflective layer,

a second antireflective layer deposited over at least a portion of the first infrared reflective layer,

a second infrared reflective layer deposited over at least a portion of the second antireflective layer, wherein the second infrared reflective layer has a thickness of about 159 to about 257 angstroms, and

a third antireflective layer having a thickness ranging from 60 to 273 angstroms over the second infrared reflective layer.